Assiniboine Delta Aquifer Management Plan

Water Use and Allocation

John Little, P. Geo.
Head
Groundwater Licensing

Ray Bodnaruk, P. Eng.
Manager
Water Licensing

Water Branch
Manitoba Conservation

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Part 1

Assiniboine Delta Aquifer Management Plan

Water Use and Allocation

The Manitoba Water Rights Act

A. Water Use Licensing Program

The legal instrument to regulate water use and water control in Manitoba is The Manitoba Water Rights Act and Regulations. Water use licensing and water control licensing are two separate program areas. Both are administered by Manitoba Conservation.

The water use licensing program is administered by the Water Licensing Section of the Water Branch. The Licensing Section's role in respect to the water use licensing program is "**to ensure the optimum development and use of the province's water resources while sustaining the resource base and maintaining environmental quality.**"

The business of water use licensing consists of two main activities that are separate yet closely interdependent --- the management of water supply budgets, and licensing of individual water use projects. **Water supply budgets** reflect water available for approved human uses from a specific water source, that is, a river system or aquifer. **Water licensing** ascribes the rights and responsibilities of a specific water user operating specific works at a specific location.

B. Water Supply Budget Management

Water is allocated on a source-specific basis taking into account, for each separate water source, its unique water supply and water demand circumstances. The supply circumstance for a specific source may differ significantly from that of other sources, the main determining factors being local climate, topography, soils/geology, land use, and natural and artificial drainage.

For every source, a water supply budget has to be established and managed. The main objectives of a water budget management are to describe water availability from the source, to protect or reserve a sufficient amount of water for important unlicensed uses (domestic needs, wetlands, aquatic life), and to make remaining water available, at a reasonable assurance level, to licensed users. Reasonable assurance of water supply means limiting the risk of water supply shortfalls (to such an extent, frequency, or duration that the shortfall would not jeopardize the security of the licence user's investment).

Water budget management essentially means balancing the total level of water use from a source against an appropriate level of assurance of water supply to all licensed users on that source. Water must be available to those water users all or most of the time.

The Water Licensing Section relies heavily on two other program areas, the Water Branch's Groundwater Management Section and Surface Water Management Section, to assess and describe the water supply circumstance and to establish the limits to which water can be safely allocated for human activities.

C. The Water Rights Act and Water Licensing

Water rights licences for individual water development projects are issued using administrative rules and procedures provided for by The Water Rights Act and Regulations, and guided by policy that reflects the main principles of the Act. The Act's most relevant provisions in respect to the regulation of water use projects and activities are as follows:

Province owns all rights to water ... The Water Rights Act states that ownership of water and all rights to its use or diversion are vested in the Crown in the Right of Manitoba.

Licence required ... The Act prohibits the construction of works or the use or diversion of water without a licence. The use of water for domestic purposes is exempt, as is the construction of a well for domestic purposes. Domestic use is the use of water at a rate of less than 25,000 litres per day for household and sanitary purposes, for watering lawns and gardens, and for the watering of livestock and poultry.

Water use licences are issued by the Director of the Water Branch on behalf of the Minister of Conservation.

Licensable uses of water ... Licensable uses of water, in order of priority as stated in the Act, are municipal, agricultural, industrial, irrigation, and other uses. A water rights licence establishes a conditional right to divert and use water. A licence does not, however, guarantee that water would always be available in the amounts and at the times required.

Preliminary works permits ... The Act provides for issuance of permits to explore for water. An example is a groundwater exploration permit, which is issued for a one-year period. The permit allows the permit holder to construct test wells to determine if water is available at a specific location. The permit also obliges the permit holder to conduct a pump test to determine local drawdown characteristics under operating conditions.

Licence and permit terms and conditions ... The terms and conditions on permits or licences are as prescribed in the Regulations or as may be required by the Water Branch on behalf of the Minister. For example, a licence for irrigation water use describes the water diversion works and the water use, as well as the location of the works and water use. The licence describes limits on the withdrawal rates and annual water use volumes, and on the number of acres of crop that can be irrigated annually. The licence describes the licensee's responsibilities and potential liabilities, including the responsibility to monitor and report water usage. The licence also absolves the Province from any claims or liability associated with the licensee's construction or operation of the works or the use of water.

Licence precedence ... The Act provides for licence precedence, which is established based on the date of receipt of each licence application. This is known as the **first-in-time first-in-right principle**. Licence precedence establishes a licensee's right to use water from a source without interference relative to the rights of junior licensed users of water from that same source.

Precedence of licence applies only once a licence is issued. Precedence does not apply to an application for a licence, as an application by itself confers no rights to water. Licence precedence overrides priorities of water use.

Term of licence and licence renewals ... Licences for water use are issued for **up to twenty years**. Licences may be issued for shorter terms if some aspect of the project's future existence is tenuous. For example, if an applicant had legal control of the land for the project for only a five-year period, then the licence would be issued for a five-year term. Licences may be renewed upon application and upon a continuing need to use water as originally licensed. An application for a licence renewal must be submitted between 365 days and 90 days before licence expiry.

Licence transfers with change in land control ... Licences expire automatically upon loss of legal control of the land on which the works are located or the water is used. A licence may be transferred, by the Minister, to the new owner or controller of the land. An application for licence transfer must be submitted by the landowner or controller. The licence could be transferred if the applicant were to continue to operate the same works, and use the water for the same purpose, at the same rates, in the same amounts, and in accordance with the same conditions as the former licensee had. An "allocation of water", which is a significant and integral part of a licence, is not transferable separate from the licence.

Licence suspension, cancellation, amendment, and other enforcement ... Licences may be suspended, cancelled, or amended by the Director of the Water Branch, on behalf of the Minister, for good cause. Good cause includes no longer needing to divert and use water as licensed, the construction or operation of unsafe works, or the failure to comply with licence terms and conditions.

Other enforcement provisions in the Act include closure or removal of works, and fines. These enforcement provisions can apply either to the construction of unauthorized (unlicensed) works or the unauthorized use of water, or for any non-compliance with the Act or a licence. The preferred approach is to get the non-complying party to comply.

Licence fees and water use charges ... As provided for in the Act, a licence fee of $50.00 must be submitted with each application for a water rights licence for a water use project. The Act and Regulations also provide for water use charges. The province currently collects water use charges only for industrial water use projects licensed under the current Act, which came into effect in 1987. The fees range from $1.00 per cubic decameter per year (first 100 cubic decameters) to $2.00 per cubic decameter (more than 20,000 cubic decameters per year).

Reservation of water ... In addition to licensing and enforcement aspects, the Act provides for the establishment of reservations of water. Water in a source may be held in reserve **by the province** for a period of time to complete an assessment of best use of the available water supply from that source. A water reservation may also be established to protect some amount of water for some future importance use, for example domestic use or municipal use. A licence application does not constitute a reservation to the applicant.

Water held in reserve by the province cannot be licensed for any use, except under conditions which do not compromise the purpose of the reservation. A water reservation by the province does not establish any right or claim to water by any specific future user.

Act's guiding principle ... The Water Rights Act is permissive, in that it provides considerable discretion to the Minister, or the Director on behalf of the Minister. Many sections and subsections of the Act describe what the Minister **may** do, not what the Minister **will** do. What the Minister in fact will do is guided by policies and administrative rules developed in recognition of the Act's over-riding principle, that being **what is in the best interests of the residents of Manitoba**.

Policies, administrative rules, and licence terms and conditions change as necessary to support evolving societal values and needs. The policies and administrative rules are nevertheless applied fairly and consistent with the overall intent of the Act to ensure the integrity of the water rights licensing process.

Part II

Assiniboine Delta Aquifer Management Plan

Water Use and Allocation

Aquifer Water Budget

- **Aquifer Sub-basins (thirteen)**

  The Assiniboine Delta Aquifer underlies a land surface area of 1,500 square miles and transcends the boundary between the Lake Manitoba Basin and the Assiniboine River Basin. The Assiniboine Delta Aquifer comprises **thirteen aquifer sub-basins**, each of which constitute a separate management unit for describing groundwater recharge and discharge, and groundwater use and allocation. A map is attached showing the aquifer subdivided into its 13 sub-basins.

  Groundwater in seven of these aquifer sub-basins flows northward, discharging into stream tributaries of the Whitemud River.

  Groundwater in the remaining six of the aquifer sub-basins discharge into the Assiniboine River system. The aquifer discharge to the Assiniboine River is a significant component of the river's base flow.

- **Aquifer Sustained Yield (166,000 acre-feet)**

  The Assiniboine Delta Aquifer's sustained yield is a measure of the amount of water that flows through the aquifer and discharges to streamflow on an average annual basis. The aquifer's average annual discharge, as determined by the Groundwater Management Section of the Water Branch, is **166,000 acre-feet**.[1]

  Any water that is pumped from the aquifer for consumptive uses will cause, over the long-term, a reduction in the average annual discharge into streamflow.

  The 166,000 acre-feet of average annual discharge from the aquifer is distributed approximately 65% to the Assiniboine system (106,000 acre-feet) and 35% to the Whitemud River tributaries (60,000 acre-feet).

- **Aquifer Developable Yield (109,000 acre-feet)**

  Of the total 1,500 square miles of land above the aquifer, only about 1,000 square miles is considered land that can be developed for irrigated crop production. Accordingly, of the Aquifer's 166,000 acre-feet sustained yield, only about **109,000 acre-feet** of water per year are available locally to developable areas of land above the aquifer.

- **Aquifer Water Allocation Limit (51,000 acre-feet)**

  Of the 109,000 acre-feet of water that are available to developable areas on the aquifer, water allocation limits have been established to protect water for unlicensed uses on the aquifer (farm and community domestic uses on the aquifer) and base flows in streams. The allocation limits are also needed to protect the licensed uses, domestic uses, and environmental instream water uses that depend on the streams' base flows that are derived from the aquifer.

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[1] An acre-foot is a convenient unit for measuring large volumes of water. An acre-foot of water is the volume of water that would cover a surface area of 1 acre to a depth of 1 foot.

The water allocation limits for the Assiniboine Delta Aquifer have been set by the Groundwater Management Section of the Water Branch, based on their evaluation of aquifer capacity and influenced by a 1991 recommendation of the former Assiniboine Delta Aquifer Management Advisory Board to the Minister of Natural Resources.

The allocation limits were initially set at 50% of the sustained yield in each sub-basin of the aquifer. The allocation limits were subsequently refined, in conjunction with a more recent (February, 1996) reassessment of the aquifer's recharge and discharge characteristics.

The current aquifer water allocation limit, as established by the Groundwater Management Section, is **50% of the sustained annual yields** under the developable areas of each sub-basin, except for two sub-basins, the Upper Whitemud East and Upper Whitemud West. In these two sub-basins the allocation limit has been set at **15% of the sustained annual yields**. These latter two allocation limits had been reduced in recognition of the importance of the streamflow of the Upper Whitemud River towards Neepawa's and Gladstone's municipal water supply.

Applying the preceding allocation limits, **the amount of water currently available on an average annual basis for licensed uses on the aquifer is 51,000 acre-feet**.

- **Aquifer Water Demand and Current Allocation**

Until the mid-seventies, there was very little water demand for licensed uses on the aquifer. At that time, irrigation was limited mostly to mixed vegetables, small fruits, and some nursery crops. Demands then began to increase significantly when crop prices improved and potato processing plants were built at Carberry and Portage la Prairie. Irrigation water demands rose most rapidly following a hot and dry period in the late eighties. The current allocation situation on the aquifer is a product of those water demands, which continue today.

As of October 12, 2001 there were **216 licensable water use projects** on the Assiniboine Delta Aquifer reflecting either water use projects that have already been licensed or projects for which applications have been received and which can be licensed. The annual allocation volume reflected by the **216 licensable projects** is about **27,000 acre-feet** of water.

Of the **216 projects**, **204 are irrigation water use projects**, reflecting an annual allocation volume of **23,000 acre-feet** or 85% of current allocation on the aquifer. Industrial use (Midwest Foods) account for four withdrawals and **3,800 acre-feet per year** (under review), or 14% of current allocation on the aquifer. The remaining eight licensed withdrawals are for domestic and agricultural uses, and account for only **200 acre-feet** of water per year.

- **Irrigation Water Use Requirements**

Irrigation requirements today comprise by far the largest licensable water demand on the aquifer, at 85% of the total current allocation. These demands are associated mostly with the need to supply potatoes for the potato processing industry at Carberry and Portage la Prairie. Potato processors are normally supplied with potatoes under contract to local growers. The processors require irrigated production to assure a consistent quality and size of potatoes and a dependable production level in dry years. The intent of these requirements is to reduce their business risks.

Irrigation water needs for growing potatoes are supplemental to precipitation. The supplementary annual water requirements to achieve a quality product and desired production level for potatoes on the land above the Assiniboine Delta Aquifer is between six inches and nine inches (10% risk level, figures provided by Manitoba Agriculture and PFRA).

The Water Branch, based on selective monitoring over a number of years, has determined that the current average annual water uses for irrigation equate to just over six inches of water per year. The Water Branch, for its water supply budget planning purposes, uses an irrigation water application rate of **0.65 feet (7.7 inches) to 0.85 feet (10.2 inches)**. These irrigation water application rates are

subject to refinement upon implementation of a comprehensive water use monitoring program on the aquifer and upon the collection of records for a sufficient number of years. Revision of these rates would also reflect further experience with and monitoring of local irrigation practices.

It is anticipated that Simplot's planned new potato processing plant for Portage la Prairie will heighten the demand for irrigated potato production on the aquifer as well as in other areas of the province.

- **Current Non-Licensed Water Use (2,000 acre-feet per year)**

The estimated present non-licensed domestic (farm and community) and agricultural groundwater use on the Assiniboine Delta Aquifer is **2,000 acre-feet per year**. This water use has been protected as part of the water that is outside the 51,000 acre-foot per year allocation limit on the aquifer.

- **Aquifer and Vicinity Farms and Community Water Demand**

In September 1997, Infrastructure Services estimated the present and future water demands of residents and communities in the aquifer and in the area surrounding the aquifer. (See attached table, "Present Day Demand and Projected Demand for ADA and Surrounding Residents and Communities"). The projected 50-year demands are about 3,550 acre-feet per year. It is unclear what portion of the projected future uses would be subject to a licence and what portion would be exempt.

- **Aquifer Average Annual Water Supply and Allocation Summary**

  - Total aquifer discharge/yield ... 166,000 acre-feet per year
  - Total developable annual yield ... 109,000 acre-feet per year
  - Total allocation limit ... 51,000 acre-feet per year
  - Total allocated/committed ... 27,000 acre-feet per year
  - Total remaining ... 24,000 acre-feet per year

See the attached table for details (Assiniboine Delta Aquifer Water Supply and Allocation).

- **The Aquifer Management Plan and Future Water Use and Allocation Issues**

The Assiniboine Delta Aquifer's present total allocation of 27,000 acre-feet per year is about 50% of the aquifer's total allocation limit, and about 16% of the aquifer's total average annual discharge.

Nevertheless, water balance information in specific sub-basins is more significant than averages that apply over the entire aquifer. Water allocations in six sub-basins comprise 155 of the total of 216 licensable projects. In each of these sub-basins (Upper Whitemud East, Upper Whitemud West, Pine Creek North, Epinette Creek North, Epinette Creek South, and Assiniboine West) water allocation is at 100% of allocation limit. Any further allocations from these sub-basins are on hold, pending refinements in water licences and pending future more detailed water use monitoring information. Decisions on further allocations from these sub-basins would further be subject to any additional findings and the recommendations from the aquifer management planning process.

The Water Licensing Section considers the Assiniboine Delta Aquifer Management Plan process as very useful toward facilitating clarification of some key concepts and responses to future water licensing issues. Several such questions and issues are as follows:

1. What specifically do the water allocation limits on the aquifer target and on what basis, if any, might these allocation limits be refined or changed? The Licensing Section has been working under the premise that these limits were established to maintain a sustainable level of base flows in the streams that flow from the aquifer, and the aquatic and domestic water uses that depend on these base flows. This then leads to the following question. What impact would full allocation on the aquifer have on the water supply budget on streams emanating from the aquifer?

It is assumed that these limits also serve to sustain important wetlands above the aquifer. This should be confirmed. As well, to what extent does the natural vegetation above the aquifer depend on the aquifer's water levels? In turn, how does the natural vegetation affect aquifer recharge and discharge?

2. As the allocation limits are reached on various sub-basins, what options, if any, are appropriate to consider for facilitating further development on the aquifer? If good quality irrigable land remains in those fully allocated sub-basins, can and should water be transferred by pipeline from undevelopable areas of the sub-basin? Can more water instead be taken from the developable areas? What precisely are the physical boundaries of the developable and undevelopable areas? Alternatively, can and should water be transferred by pipeline from the adjacent sub-basins with remaining licensable water but where sufficient suitable irrigable lands might not exist? The irrigation community is asking these questions, as are other government departments, such as Manitoba Agriculture.

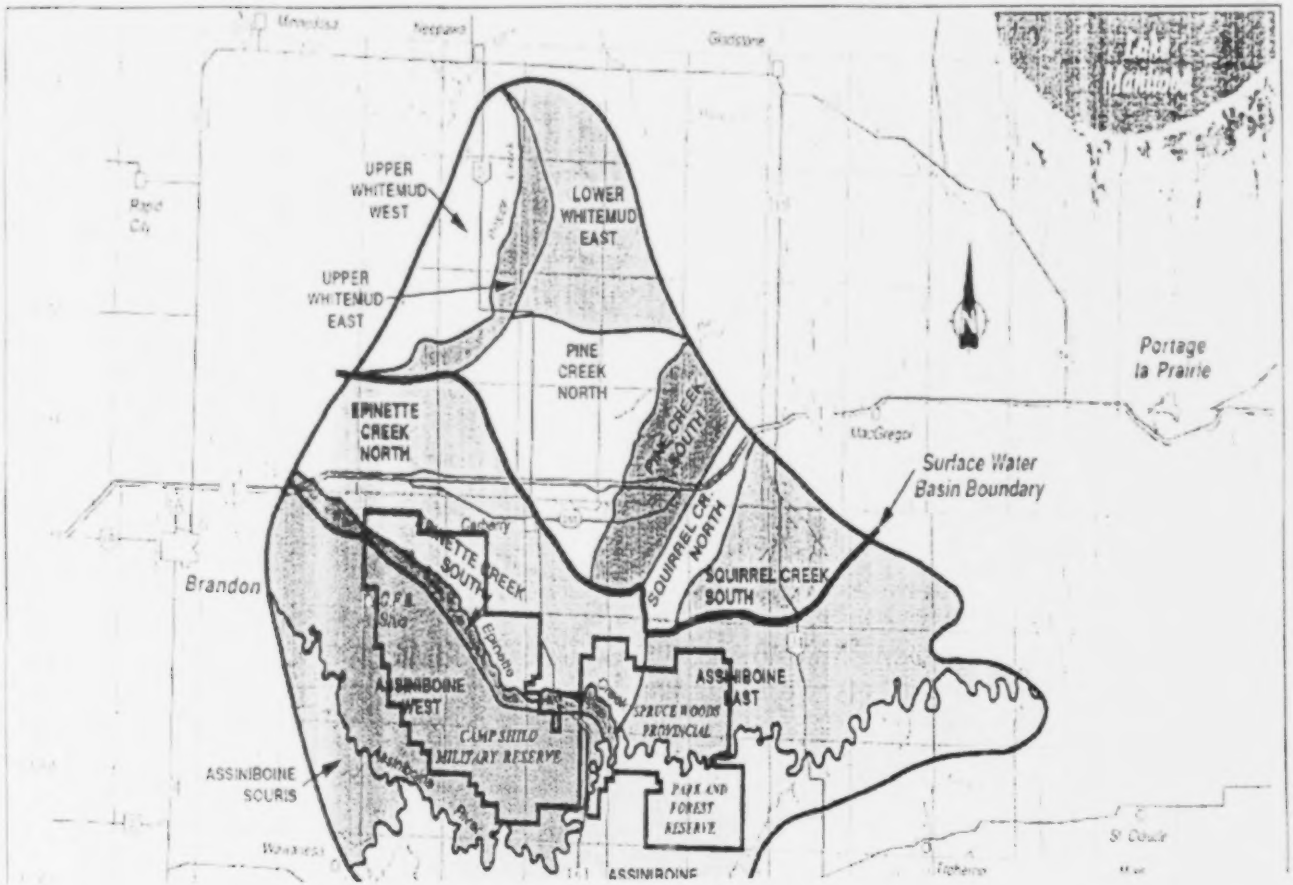
It is conceivable that at present there might not be clear answers to some of these questions, and that perhaps the answers would emanate from further experience and knowledge gained over time. Perhaps some closely monitored prototypes and test situations would be considered appropriate. Nevertheless, the need to consider these options would almost certainly increase with increased water development pressure, particularly as available supplies become fully allocated. Hopefully the management planning process and the plan implementation stage will assist in resolving some of these questions and issues.

PRESENT DAY DEMAND AND PROJECTED DEMAND FOR ADA AND SURROUNDING RESIDENTS AND COMMUNITIES

PRESENT DAY DEMAND			20 YEAR DEMAND		40 YEAR DEMAND		50 YEAR DEMAND	
Location	**POP**	**Annual**	**POP**	**Annual**	**POP**	**Annual**		**Annual**
		Acre-feet		**Acre-feet**		**Acre-feet**		**Acre-feet**
Neepawa	3258	415	3970	637	4840	860		944
Gladstone	928	115	1122	132	1356	160		176
Glenboro	674	55	817	76	986	103		114
Augtin/MacGregor	1475	121	2070	170	2840	232		256
Carberry	1481	120	1811	168	2200	230		254
Plumas	308	25	355	34	426	45		49
Glenella	157	14	197	18	237	25		27
Rural	2200	162	2200	162	2200	162		180
Hutterite Colonies	5	168	5	168	5	168		184
Cattle (Westlake)	28650	423	32300	478	38600	570		627
Shilo (CFB)	3300	672	3300	672	3300	672		739
Total (AF)		**2290**		**2715**		**3227**		**3550**

Modified from data supplied from MWSB

WB 11/20/97


UPPER WHITEMUD WEST
LOWER WHITEMUD EAST
UPPER WHITEMUD EAST
PINE CREEK NORTH
PINE CREEK SOUTH
EPINETTE CREEK NORTH
SQUIRREL CR. NORTH
SQUIRREL CREEK SOUTH
Surface Water Basin Boundary
Portage la Prairie
Brandon
EPINETTE CREEK SOUTH
ASSINIBOINE WEST
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CAMP SHILO MILITARY RESERVE
SPRUCE WOODS PROVINCIAL PARK AND FOREST RESERVE
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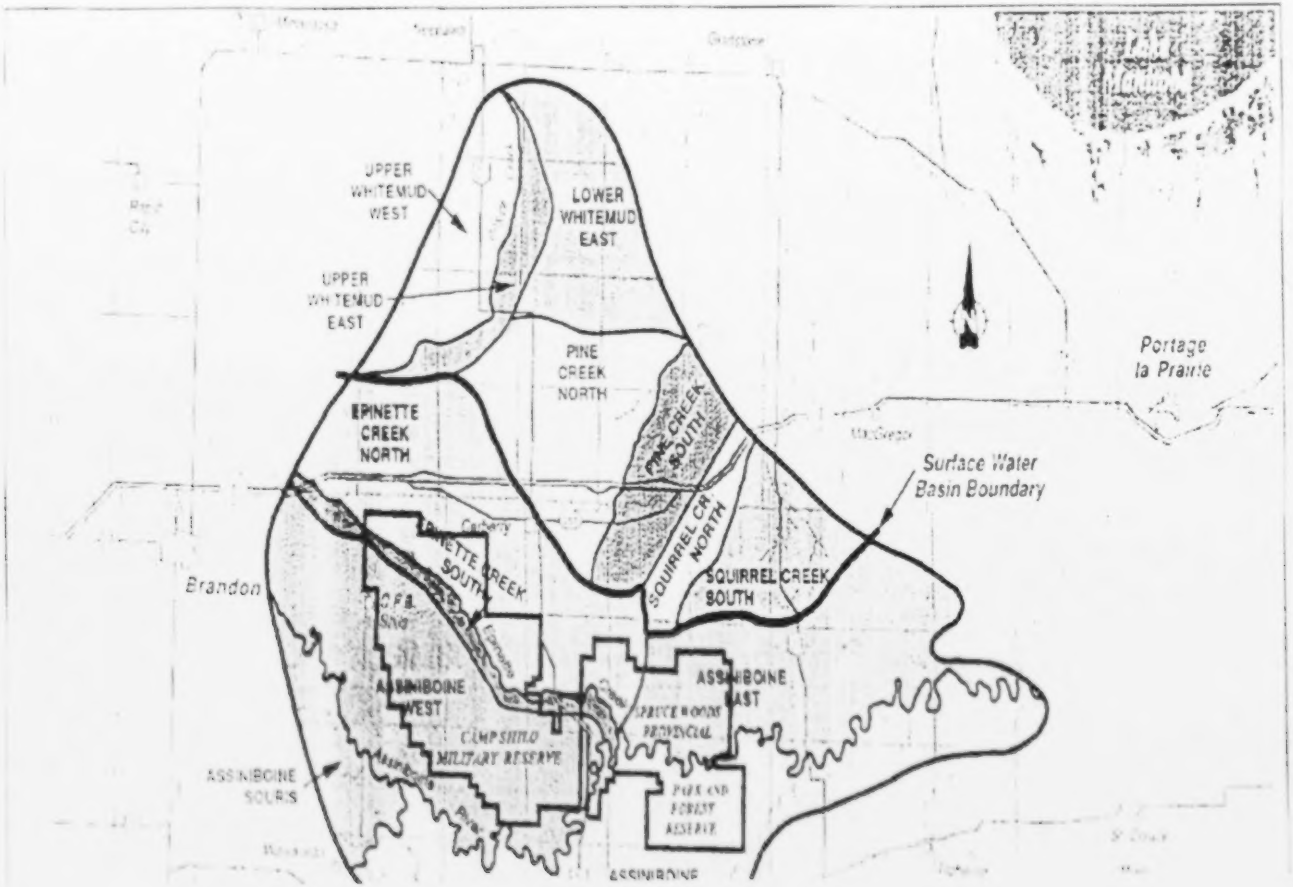
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ASSINIBOINE DELTA AQUIFER
WATER SUPPLY AND ALLOCATION

SUB BASIN	TOTAL DEVELOP. YIELD (acre-ft/yr)	ALLOC. LIMIT (acre-ft/yr)	ANNUAL ALLOC. (acre-ft/yr)	REMAINING ALLOC. POTENTIAL (acre-ft/yr)	LICENSABLE PROJECTS			APPLIC. ON HOLD
					TOTAL NUMBER PROJECTS	NUMBER OF IRRIG. PROJECTS	ANNUAL IRRIG. ACRES	
WHITEMUD SUB BASINS								
Upper Whitemud West	6519	978	979	0	9	8	1490	8
Upper Whitemud East	4236	636	613	23	7	7	943	5
Lower Whitemud East	8521	4260	2054	2206	20	20	3160	0
Pine Creek North	11000	5500	5508	0	49	48	6935	23
Pine Creek South	5692	2846	1257	1589	15	15	1935	0
Squirrel Creek North	3015	1507	350	1157	5	5	538	0
Squirrel Creek South	7126	3563	129	3434	2	2	260	0
Sub Total	**46109**	**19290**	**10890**	**8409**	**107**	**105**	**15261**	**36**
ASSINIBONIE SUB BASINS								
Epinette Creek North	18000	9000	9765	0	57	51	9521	23
Epinette Creek South	335	167	128	39	1	1	160	1
Assiniboine East	15900	7950	205	7745	4	2	240	0
Assiniboine South	17754	8877	2079	6798	15	13	3104	0
Assiniboine West	8256	4128	4148	0	32	32	5185	21
Assiniboine Souris	2866	1433	0	1433	0	0	0	0
Sub Total	**63111**	**31555**	**16324**	**16015**	**109**	**99**	**18210**	**45**
Total	**109220**	**50845**	**27214**	**24424**	**215**	**204**	**33471**	**81**

[1] Number of applications beyond the allocation limit

Current as of November 20, 2001

Manitoba Conservation
Water Branch
Water Licensing Section

Part III

Assiniboine Delta Aquifer Management Plan

Water Use and Allocation

Current Licensing Initiatives

- **Administrative Functions**

Licence form ... The Water Branch has changed the licence form to accurately describe the irrigated land base location and annual irrigated acreage, the maximum amount of water that may be applied to that land base in any one year, as well as the maximum application rate and the average yearly allocation to that land base.

Irrigation licensing project questionnaires ... The Water Branch has implemented the use of detailed irrigation project questionnaires for irrigation project proposals. Questionnaires are completed by applicants with assistance of Water Branch technicians. Questionnaires, which are signed and dated by the applicant, form one of the basis on which a water rights licence is issued.

Licensed project audit ... A comprehensive audit of all licensed projects on the aquifer is being done to verify that the information on file is correct and that the irrigation practice matches the licence. The intent is also to provide a base of information that can be used with confidence for licensing decisions and water budget management. A licensing technician will meet with each licensee and a detailed irrigation questionnaire will be produced. A replacement licence (in the new format) will be issued and, where necessary, licence amendments will be made to accurately reflect the irrigation practice.

- **Staffing Functions**

Two new technicians to support groundwater irrigation licensing ... Two groundwater licensing technicians have been hired for a 3-year term - one located at MCDC and one located at the Water Branch office in Winnipeg. The MCDC based position is assigned full time to groundwater licensing activities on the aquifer, with some minor licensing action on the Oak Lake Aquifer. The Winnipeg based position supports licensing activities on the aquifer but also supports province wide licensing activities. Specific to the ADA, licensing technicians are responsible for preparation of detailed irrigation project questionnaires, locating irrigation wells by GPS, and administration of the water use monitoring program (as described in the section, Program Function).

Livestock water use licensing technician ... A technician has been hired on term to provide support for livestock project licensing. Having the position allows more time for licensing staff to be committed to ADA licensing activities.

Licensing hydrogeologist ... One permanent position hydrogeologist to support - firstly, irrigation water use licensing activities on the ADA, secondly, livestock licensing activities province wide and thirdly, other licensing activities as required.

- **Program Functions**

Administered by water licensing technicians, reporting to the Head, Groundwater Licensing, the licensing program function on the aquifer includes the following strategies:

1. **Water use monitoring** - using time clocks on irrigation well pumps to record pumping time and independent flow rate calibration of irrigation systems would allow the annual withdrawal from the aquifer can be accurately determined. Irrigators are required to complete time cards each year

and return cards at the end of the irrigation season to MCDC, where the information will be compiled by licensing staff.

2. **Irrigation well head inventory** - The intent of this program is to accurately locate all irrigation wells and irrigation dugouts by GPS, to photograph the well head and plumbing and take plumbing measurements. This information would be used to determine those systems where a noninvasive flow meter can be used and those systems where flow meters would need to be installed.

3. **Detailed irrigation project questionnaires** - This involves working with applicants and licensees to provide accurate irrigation project information and project drawings and plans.

4. **Well pump testing** - This involves providing direction to applicants who are required to carry out well pump testing in support of licensing their irrigation project proposal. Licensing staff would instruct applicants on testing methods, provide water level measuring equipment and measure the pumping rate during the test using a noninvasive flow meter.